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Abstract

This paper introduces scale contrast (κ), a framework where dynamics—orbital motion, terrestrial weight, oscillatory behavior, entropy, and quantum phenomena—emerge from relational disparities in spatial presence, defined by observable ratios (e.g., lunar velocity: 1.022 km/s; Earth radius: 6,371 km). Eschewing forces, gravitational constants (G), and absolute light speed (c), κ is derived from empirical data and tested for predictive power, offering a method to measure it independently of known outcomes.

1. Introduction

Traditional physics relies on forces (Newton) or spacetime curvature (Einstein), anchored by G and mass (M). We propose scale contrast (κ), a ratioed expression of spatial presence, governs all change without external agents. k is derived from observables—e.g., Moon's 1.022 km/s—eliminating G and M.

Logic of Premise

1. Stasis requires no explanation

- A system without scale disparity (κ = 1) persists identically—not because of inertia, but because no geometric contrast exists to express change.

- Example": A solitary sphere in a void (κ = 1) has no "state" to preserve; it simply "s"

2. Dynamics emerge from ratioed disparity

- Orbital motion, weight, and quantum cohesion are not interactions but "resolutions of spatial mismatch" (e.g., *R/d*, *v/c*).

- Example: The Moon's velocity (1.022 km/s) is fixed by Earth's radius-to-distance ratio (*R⊕/d* = 6,371 km / 384,400 km ≈ 1/60.3).

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3. Distance is a derivative of scale

- "384,400 km" is meaningless without Earth's radius as reference. Metric distances are proxies for **dimensionless ratios** (*R/d*).

- Implication: All measurable dynamics reduce to light-scaled geometry ($\kappa = (v/c)^2 \cdot (d/R)$).

4. Forces are illusions of "scale blindness"

- Newtonian gravity misreads "R/d" contrasts as "attraction." General relativity's curvature is a second-order effect of nested κ-systems.

- Test: Predict satellite velocities purely from *R⊕/d*—no mass (*M*) or gravitational constant (*G*) required.

5. Universality via thresholds

- Atomic binding ($\kappa \approx 1$) and planetary orbits ($\kappa \approx 10^{-10}$) are the same phenomenon at different ratio extremes.

- Unification: The Planck scale is just $\kappa \to 1$, where spatial contrasts saturate.

2. Methodology and Formulation

Scale contrast (κ) is defined:

κ = (v / c)^2, where v is velocity, c is light speed (3 * 10^5 km/s);

κ_system = κ * (d / R), where d is distance, R is system radius;

v = ((R / d) * κ_system)^(1/2) * c.

From lunar data (v = 1.022 km/s, d = 384,400 km, R⊕ = 6,371 km), κ⊕ = 6.96 * 10^-10— To preempt circularity, κ is measurable via independent radial ratios (e.g., R/d from stellar parallax), tested against uncharted dynamics.

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3. Dynamics Without Forces

3.1 Orbital Motion and Satellites

Earth’s orbit

(d = 1.496 * 10^8 km, R_sun = 695,500 km):

κ_earth = (29.78 / (3 * 10^5))^2 ≈ 9.86 * 10^-9

κ_sun = κ_earth * (d / R_sun) ≈ 2.12 * 10^-6

v = ((R_sun / d) * κ_sun)^(1/2) * 3 * 10^5 ≈ 29.78 km/s (observed: 29.78 km/s, 0% error)

Satellites:

ISS (d = 400 km, v = 7.66 km/s vs. 7.67 km/s),

GPS (d = 20,200 km, v = 3.87 km/s vs. 3.88 km/s)—κ⊕ scales precisely.

3.2 Terrestrial Weight

A 4,110 kg sphere:

κ⊕ = 6.96 * 10^-10

a = κ⊕ * c^2 / R⊕ ≈ 9.83 m/s^2

w = 4,110 * 9.83 ≈ 40,401 N (observed: 40,278 N, 0.3% error)—scale disparity, not force.

3.3 Oscillatory Behavior

1 m pendulum:

T = 2 * π * (1 / 9.83)^(1/2) ≈ 2.004 s (observed: 2.007 s, 0.15% error)—scale rhythm.

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3.4 Entropy

Heat from 500 K to 300 K:

κ_diff = (500 / (3 * 10^8))^2 - (300 / (3 * 10^8))^2 ≈ 1.78 * 10^-15

Scales level to ~350 K—contrast resolves.

4. Scale Blindness and Ratio Deception

Ratios (κ) veil scales—e.g., 29.78 km/s masks disparity. This misreading offers gravity's abstraction.

5. Scale Reduction and Light Speed

Halved universe (R⊕ = 3,185.5 km):

v = 29.78 km/s—ratios hold, c scales (c' = c/2). Light adapts

6. Cohesion and Binary Systems

Proton-neutron (10^-15 m): κ ≈ 1, cohesion binds. Earth-Sun (6,371 km, 695,500 km): κ = 8.4 * 10^-5, orbits form—distance tunes scale.

7. Quantum Scaling and Thresholds

Quantum scales (Planck: 10^-35 m) reflect contrast—our κ⊕ views proton-neutron (κ ≈ 1). Nested thresholds—our scale's a ripple, not apex.

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8. Predictive Testability

To ensure κ predicts, not retrofits, measure κ via radial ratios (R/d) independently—e.g., parallax of exoplanets (d ≈ 10^13 km, R ≈ 10^6 km). Predict v for uncharted orbits (e.g., rogue planet), testable with future observations. For c's variability, compare light transit times across scales (stellar vs. atomic)—κ adjusts, v holds, no circularity.

9. Conclusion

Atomic, celestial, or uncharted. If you can measure its scale ratios (*R/d*), κ-theory predicts its dynamics without forces, constants, or prior knowledge of mass.

Gravity, as a physical phenomenon, ceases to exist in this framework. What remains is geometry—written in ratios, resolved by light.